

AMENDMENTS TO THE CLAIMS

Claim 1 (cancelled)

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Claim 2 (currently amended): The optical device of Claim ~~1~~ 5 wherein said programmable elements are formed in a two dimensional array.

Claim 3 (currently amended): The optical device of Claim ~~1~~ 5 wherein each of said programmable elements has conductive contacts, and wherein said conductive contacts are selected from metals consisting of aluminum and aluminum alloys.

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Claim 4 (cancelled)

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Claim 5 (currently amended): ~~The device of Claim 1 further comprising~~ An optical device comprising:

programmable elements formed on a surface of a substrate, said programmable elements capable of being selectively programmed to create a reflective filament pattern for reflecting radiation in a selected optical pattern; and

an address decoder on said substrate for selectively addressing said programmable elements for programming.

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Claim 6 (cancelled)

Claim 7 (cancelled)

Claim 8 (cancelled)

Claim 9 (cancelled)

Claim 10 (cancelled)

Claim 11 (cancelled)

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Claim 12 (currently amended): The optical device of Claim ± 5 further comprising a package containing said substrate, said package having a window exposing said programmable elements, said package having conductive terminals for programming said programmable elements.

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Claim 13 (cancelled)

Claim 14 (cancelled)

Claim 15 (cancelled)

Claim 16 (cancelled)

Claim 17 (cancelled)

Claim 18 (cancelled)

Claim 19 (cancelled)

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Claim 20 (currently amended): The optical device of Claim ± 5 wherein said selected optical pattern is an optical image.

Claim 21 (currently amended): The optical device of Claim ± 5 wherein said selected optical pattern is an optical code.

Claim 22 (currently amended): The optical device of Claim 4 5 wherein said selected optical pattern is a pattern for exposing photosensitive material.

Claim 23 (currently amended): The optical device of Claim 4 5 wherein said programmable elements are diodes.

Claim 24 (currently amended): The optical device of Claim 4 5 wherein said programmable elements are zener diodes.

Claim 25 (currently amended): The optical device of Claim 4 5 wherein said programmable elements are transistors.

Claim 26 (currently amended): The optical device of Claim 4 5 further comprising semiconductor regions over which are formed conductive contacts for each of said programmable elements.

Claim 27 (currently amended): The optical device of Claim 4 5 wherein said substrate is a semiconductor substrate.

Claim 28 (cancelled)

Claim 29 (cancelled)

Claim 30 (currently amended): The optical device of Claim 4 5 wherein said reflective filament pattern is both optically detectable, by detecting said optical pattern, and electrically detectable, by detecting electrical shorts ~~between~~ in said ~~contacts~~ reflective filament pattern.

Claim 31 (cancelled)

Claim 32 (cancelled)

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Claim 33 (currently amended): The optical device of Claim 1 5 wherein said programmable elements comprise normally-shorting conductive filaments between ~~two filament~~ contact areas, said normally-shorting conductive filaments forming an open circuit between said contact areas when blown during programming.

Claim 34 (currently amended): A method for selectively reflecting light comprising:

providing programmable elements on a surface of a substrate;

programming an array of said programmable elements on a surface of a substrate to create a pattern of reflective filaments; and

applying radiation to said surface, such that radiation is reflected from said pattern of reflective filaments in a selected pattern.

Claim 35 (original): The method of Claim 34 wherein said selected pattern conveys optical information.

Claim 36 (original): The method of Claim 34 wherein said selected pattern is an optical image.

Claim 37 (original): The method of Claim 34 wherein said selected pattern is an optical code.

Claim 38 (original): The method of Claim 34 wherein said selected pattern is a pattern for exposing photosensitive material to light.

Claim 39 (currently amended): The method of Claim 34, further comprising:

detecting a pattern of radiation that has passed through said substrate, said pattern of reflective filaments at least partially blocking said radiation from passing through said substrate.

Claim 40 (currently amended): The method of Claim 34 wherein said programmable elements are diodes.

Claim 41 (currently amended): The method of Claim 34 wherein said programmable elements are zener diodes.

Claim 42 (currently amended): The method of Claim 34 wherein said programmable elements are transistors.

Claim 43 (currently amended): The method of Claim 34 wherein each of said programmable elements are comprises a normally-shortening conductive filaments between two filament contact areas.

Claim 44 (currently amended): The method of Claim 34 wherein said programmable elements are fuses.

Claim 45 (currently amended): The method of Claim 34 wherein said programmable elements are anti-fuses.

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Claim 46 (re-presented - formerly dependent claim # 31): An optical device comprising:

programmable elements formed on a surface of a substrate, said programmable elements capable of being selectively programmed to create a reflective filament

*Claim 47*  
pattern for reflecting radiation in a selected optical pattern; and

a read circuit electrically coupled to said programmable elements for reading said programmable elements after programming.

Claim 47 (re-presented - formerly dependent claim # 32): The optical device of Claim 46 wherein said read circuit is formed on said substrate.

Claim 48 (new): A device comprising one or more programmable elements, the one or more programmable elements being selectively programmable to create a reflective filament pattern for creating a selected optical pattern.

Claim 49 (new): The device of Claim 48, wherein each of the one or more programmable elements comprises:

a first contact; and

a second contact, wherein applying a programming current or a programming voltage across the first contact and the second contact of a selected one of the one or more programmable elements programs the selected one of the one or more programmable elements.

Claim 50 (new): The device of Claim 49, wherein the first contact and the second contact in each of the one or more programmable elements are formed of metal, and wherein applying the programming current or the programming voltage across the first contact and the second contact causes migration of the metal between the first contact and the second contact to form at least one reflective filament.

Claim 51 (new): The device of Claim 50, wherein the at least one reflective filament comprises a single reflective filament connecting the first contact to the second contact.

Claim 52 (new): The device of Claim 50, wherein the at least one reflective filament comprises a first reflective filament extending from the first contact, wherein the first reflective filament does not provide an electrical short between the first contact and the second contact.

Claim 53 (new): The device of Claim 50, wherein the metal comprises aluminum or an aluminum alloy.

Claim 54 (new): The device of Claim 50, wherein each of the one or more programmable elements comprises a diode.

Claim 55 (new): The device of Claim 54, wherein the diode comprises a zener diode.

Claim 56 (new): The device of Claim 54, wherein the diode comprises an avalanche diode.

Claim 57 (new): The device of Claim 50, wherein each of the one or more programmable elements comprises a transistor.

Claim 58 (new): The device of Claim 49, wherein each of the one or more programmable elements includes a reflective filament between the two contacts, and wherein applying the programming current or the programming voltage across the first contact and the second contact melts the reflective filament to create a gap in the reflective filament.

Claim 59 (new): The device of Claim 48, further comprising an address decoder for selectively addressing the one or more programmable elements for programming.

Claim 60 (new): The device of Claim 48, further comprising a read circuit electrically coupled to the one or more programmable elements for reading the reflective filament pattern.

Claim 61 (new): The device of Claim 48, wherein the selected optical pattern is formed by portions of an incident radiation beam reflected by the reflective filament pattern.

Claim 62 (new): The device of Claim 48, wherein the selected optical pattern is formed by portions of an incident radiation beam not reflected by the reflective filament pattern.

Claim 63 (new): A method of conveying optical information, the method comprising:

providing an optical device programmed to include a plurality of reflective filaments forming a reflective filament pattern, the optical device comprising a first plurality of contact pairs and a second plurality of contact pairs, each of the first plurality of contact pairs being coupled by at least one of the plurality of reflective filaments, and none of the second plurality of contact pairs being coupled by any of the plurality of reflective filaments; and

directing radiation at the reflective filament pattern to generate an optical pattern, the optical pattern carrying the optical information.



Claim 64 (new): The method of Claim 63, wherein the first plurality of contact pairs and the second plurality of contact pairs are formed from metal on a semiconductor substrate, and wherein the plurality of reflective filaments are formed by metal migration between each of the first plurality of contact pairs.

Claim 65 (new): The method of Claim 64, wherein the metal comprises aluminum or an aluminum alloy.

Claim 66 (new): The method of Claim 63, wherein the first plurality of contact pairs and the second plurality of contact pairs form contacts for semiconductor devices.

Claim 67 (new): The method of Claim 63, wherein each of the first plurality of contact pairs forms contacts for an unblown fuse, and wherein each of the second plurality of contact pairs forms contacts for a blown fuse.

Claim 68 (new): The method of Claim 63, further comprising receiving the optical pattern to acquire the optical information.

Claim 69 (new): The method of Claim 68, wherein receiving the optical pattern comprises directing a portion of the optical pattern into an optical fiber.

Claim 70 (new): The method of Claim 68, wherein receiving the optical pattern comprises exposing a photosensitive layer with the optical pattern.

Claim 71 (new): The method of Claim 70, wherein the photosensitive layer comprises a photoresist layer on a semiconductor substrate.

Claim 72 (new): The method of Claim 70, wherein the photosensitive layer comprises a photosensitive chemical capping bonding sites on a DNA microarray.

Claim 73 (new): The method of Claim 63, wherein the optical pattern is formed by radiation reflected by the reflective filament pattern.

Claim 74 (new): The method of Claim 63, wherein the optical pattern is formed by radiation not reflected by the reflective filament pattern.

Claim 75 (new): An optical assembly comprising:

an optical device programmed to include a plurality of reflective filaments forming a reflective filament pattern, the optical device comprising a first plurality of contact pairs and a second plurality of contact pairs, each of the first plurality of contact pairs being coupled by at least one of the plurality of reflective filaments, and none of the second plurality of contact pairs being coupled by any of the plurality of reflective filaments; and

a light source for directing light at the reflective filament pattern to generate an optical pattern.

Claim 76 (new): The optical assembly of Claim 75, further comprising at least one optical fiber for receiving the optical pattern from the optical device.

Claim 77 (new): The optical assembly of Claim 75, wherein the first plurality of contact pairs and the second plurality of contact pairs form contacts for a plurality of semiconductor devices.

Claim 78 (new): The optical assembly of Claim 77, wherein the semiconductor devices comprise zener diodes.

Claim 79 (new): The optical assembly of Claim 77, wherein the semiconductor devices comprise avalanche diodes.

Claim 80 (new): The optical assembly of Claim 77, wherein the semiconductor devices comprise transistors.

Claim 81 (new): The optical assembly of Claim 75, wherein each of the first plurality of contact pairs forms contacts for an unblown fuse, and wherein each of the second plurality of contact pairs forms contacts for a blown fuse.

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